TECHNICAL REVIEW DOCUMENT
for
MODIFICATION TO OPERATING PERMIT 99OPBO223

International Business Machines
Boulder County
Source ID 0130006

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Revised June 2009

I. Purpose:

This document establishes the decisions made regarding the requested modification to the Operating Permit for International Business Machines (IBM). This document provides information describing the type of modification and the changes made to the permit as requested by the source and the changes made due to the Division's analysis. This document is designed for reference during review of the proposed permit by EPA and for future reference by the Division to aid in any additional permit modifications at this facility. The conclusions made in this report are based on the information provided in the requests for modification submitted to the Division on April 24, 2009 and June 8, 2009, additional information submitted on May 26 and June 1, 2009, e-mail correspondence and telephone conversations with the source. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

II. Description of Permit Modification Request/Modification Type

The Operating Permit for IBM was renewed on December 1, 2007. The purpose of this modification is to incorporate the requirements of Colorado Construction Permit 07BO0830 into the Title V permit. Colorado Construction Permit 07BO0830 was issued on November 19, 2007 for an additional nine (9) new emergency generators. In addition, IBM is requesting that the requirement to operate only five (5) generators at one time be removed from 07BO0830.

Colorado Regulation No. 3, Part C, Section X.A identifies those modifications that can

be processed under the minor permit modification procedures. Specifically, minor permit modifications "are not otherwise required by the Division to be processed as a significant modification" (Colorado Regulation No. 3, Part C, Section X.A.6).

The Division requires that "any change that causes a significant increase in emissions" be processed as a significant modification (Colorado Regulation No. 3, Part C, Section I.A.7.(a)). According to Part F of Regulation No. 3 (Section I.L, revisions adopted July 15, 1993, Subsection I.G for modifications) the Division considers that a significant increase in emissions is the potential to emit above the PSD significance. The emission limitations in Colorado Construction Permit 07BO0830 are 21.65 tons/yr NO_X and 2.64 tons/yr CO, which are both below the PSD significance levels (NO_X – 40 tons/yr, CO 100 tons/yr). Therefore, the Division considers that this modification qualifies as a minor modification.

In addition, the Division requires that "any change that is considered a modification under Title I of the Federal Act" be processed as a significant permit modification (Colorado Regulation No. 3, Part C, Section I.B.36.h.(ii)). Part F of Regulation 3 Section I.L, revisions adopted July 15, 1993, Subsection I.G for modifications) describes more specifically what constitutes a modification under Title I of the Federal Act and it indicates that a modification which triggers either Section 111 (NSPS) or 112 (MACT) requirements is considered a Title I modification. The emergency generators are subject to the provisions in 40 CFR Part 60 Subpart IIII; however, other emergency generators in the existing Title V permit are subject to 40 CFR Part 60 Subpart IIII and the appropriate requirements are included in the current Title V permit. Therefore, the Division considers that since no new NSPS requirements will be included in the permit with this modification, it can be processed as a minor modification.

The Division requires that "every significant change in existing monitoring permit terms or conditions" and "every relaxation of reporting or record keeping permit terms or conditions" be processed as a significant modification (Colorado Regulation No. 3, Part C, Sections I.A.7.f and g). The source requested that the Condition 10 in Colorado Construction Permit 07BO07830 not be included in the Title V permit. Condition 10 specifies that only five (5) generators be operated at one time. This condition was included because at the short term emission rates included in the construction permit, the source would have exceeded the significance level and triggered a cumulative ambient impact analysis if all nine engines were permitted to operate simultaneously. However, the source indicates that at the lower emission rate determined by the required performance test, such a requirement is not necessary. The Division agrees that this modification to the construction permit is not a significant change in monitoring or a relaxation in reporting or recordkeeping and therefore, can be processed as a minor modification.

In their initial request for a modification (submitted on April 24, 2009), the source didn't specify how they wanted this modification processed. However, in their June 8, 2009 submittal, the source indicated that they would like these modifications processed as a minor modification under the provisions in Colorado Regulation No. 3, Part C, Section

X. As discussed above, the Division agrees that the requested modifications can be processed as a minor modification.

The potential to emit (PTE) for this facility after the modification is shown in the below table:

Emission Unit	Potential to Emit (tons/yr)						
	PM	PM_{10}	SO_2	NO_X	CO	VOC	HAPs
19 Emergency Generators and 2 Firewater pumps (95BO557)	2	2	0.6	41.6	14.8	1.7	See Table on Page 8
8 Emergency Generators (00BO0630)	0.1	0.1	0.2	20.7	7.4	0.24	
Boilers 1 – 4 (94BO366)	3.1	3.1	1.1	50.6	40.3	2.0	
B011W Cooling Tower	1.86	1.86				0.15	
B011 Cooling Tower	3.08	3.08				0.09	
B003 Cooling Tower	0.9	0.9				0.09	
Nine (9) Emergency Generators (07BO0730)	0.18	0.18	0.05	21.65	2.64	0.53	
Total	11.22	11.22	1.95	134.55	65.14	4.80	3.44

In the above table the criteria pollutant PTE is based on permitted emissions or the appropriate emission factors, design rate and 8760 hours per year of operation.

In the above table, the breakdown of HAP emissions by emission unit and individual HAP is provided on page 8 of this document. HAP emissions are based on permitted fuel consumption limits and the appropriate emission factors and/or design rate, the appropriate emission factors and 8760 hours per year of operation.

III. Modeling

During processing of the original construction permit, the source took a limit to operate only 5 engines at one time in order to avoid a cumulative impact analysis (with five engines operating the impacts were below the significance level). Short-term emission limits were included in the permit for PM_{10} and CO, since they were lower than the short-term emission rates in the NSPS. The construction permit included a requirement to conduct a performance test to verify compliance with the short-term PM_{10} and CO emission rates. The performance test indicated the short-term PM_{10} emission rate was lower than the short-term permit limit. Therefore, the source submitted revised Screen 3 model runs to demonstrate that at the lower PM_{10} emission rate that the impacts from all 9 engines operating together are below the significance level. The impacts from all 9 engines operating together are shown in the table below:

Pollutant	Averaging Time	Maximum Predicted Impact ($\mu g/m^3$)	Significance Level ($\mu g/m^3$)
PM_{10}	24-hour	4.94	5.0
CO	1-hour	208.39	2,000
CO	8-hour	145.87	500

Note that the lower PM_{10} emission rate used in the modeling analysis will be included in the revised Title V permit.

IV. Discussion of Modifications Made

Source Requested Modifications

The Division addressed the source's requested modifications as follows:

Addition of Nine (9) New Emergency Generators

In their April 24, 2009 submittal, the source requested that the provisions from the construction permit for the nine (9) new emergency generators be incorporated into the Title V permit, with one modification to the underlying construction permit (removal of Condition 10 – the requirement to operate only five engines at a time). The nine (9) new engines were addressed as follows:

Section II, Condition 8

G032 – G040: Nine (9) Caterpillar, Model No. 3516DTA, Diesel Fired Emergency Generator Sets, Six (6) Rated at 3604 hp (2500 kw) and 23.7 mmBtu/hr (173.3 gal/hr) and Three (3) Rated at 2937 hp (2000 kw) and 19.0 mmBtu/hr (138.9 gal/hr), Serial Nos. SBK00332, 00334, 00338, 00349, 00340 and 00396 and SBJ00633, 00634 and 00635.

1. Applicable Requirements: An initial approval construction permit (07BO0830) was issued for the nine emergency generators on November 19, 2007. The six larger engines commenced operation in May 2008 and the three smaller engines commenced operation in December 2008.

The source self-certified compliance with construction permit 07BO0830 on September 30, 2008. Therefore, under the provisions of Colorado Regulation No. 3, Part C, Section V.A.3, the Division will not issue a final approval construction permit and is allowing the initial approval construction permit to continue in full force and effect. The appropriate applicable requirements from the modified initial approval construction permits have been incorporated into the renewal permit as follows:

- Construction shall commence within 18 months of permit issuance (condition 1)

  The engine has commenced operation; therefore, the requirement to commence

construction will not be included in the permit.

- The permittee shall notify the Division 30 days prior to startup (condition 2)

  The Division submitted startup notices for these engines on February 13, 2008 (G032 – G037) and September 19, 2008 (G038 – G040). Since this requirement has been fulfilled it will not be included in the permit.

- Manufacturer, model number and serial number shall be provided prior to final approval (condition 3)

  The make, model and serial number for the engines were provided on the startup notices. Since this requirement has been fulfilled it will not be included in the permit.

- Except as provided for below, opacity of emissions shall not exceed 20% opacity (condition 4)

- Opacity of emissions shall not exceed 30% under certain specific conditions (condition 5)

- **All engines together** shall be subject to the following fuel use limits (condition 7):

  Diesel Fuel 155,970 gallons/yr

- **All engines together** shall be subject to the following emission limits (condition 8)

  - NO_X 21.65 tons/yr
  - CO 2.64 tons/yr

- Short term emissions **from each engine** shall not exceed the following limitations (condition 9)

  - PM_{10} 0.4 lbs/hr
  - CO 5.9 lbs/hr

  Note that as indicated under the modeling discussion (Section III of this document) that the PM_{10} short term emission limit has been revised to 0.35 lbs/hr based on the results of the performance test and the emission rates used in the revised Screen 3 model runs.

- No more than five emergency generators may be run at a time (condition 10)

  As discussed previously in this document, the source requested that this condition be removed. Based on the results of the performance test and the revised Screen 3 analysis (addressed in the modeling discussion in Section III of

this document), the source demonstrated that this requirement was no longer necessary, therefore, it has not been included in the operating permit.

- The sulfur content of the diesel fuel used in shall not exceed 0.0045% by weight.(condition 11)

- SO_2 emissions from each emergency generator shall not exceed 0.8 lb/mmBtu (condition 12)

- RACT for CO and PM_{10} shall be met through good combustion practices and use of low sulfur ($\leq$ 0.0045 wt percent) diesel fuel (condition 13)

- RACT for VOC shall be met through good combustion practices and use of low sulfur ($\leq$ 0.0045 wt percent) diesel fuel (condition 14)

- Each emergency generator is subject to the requirements in NSPS Subpart IIII (Condition 15)

- A performance test shall be conducted on one representative emergency generator to demonstrate compliance with the short-term PM_{10} and CO emission limitations (condition 16)

  A performance test was conducted on May 8, 2008 on one of the emergency generators. Therefore, since this requirement has been completed it will not be included in the operating permit.

- Prior to final approval a proposed recordkeeping format will be submitted (condition 17)

  The operating permit will specify the recordkeeping requirements for these engines; therefore, this requirement will not be included in the operating permit.

- Within 180 days after commencement of operation, compliance with the conditions contained on this permit shall be demonstrated to the Division (condition 18)

  The source submitted a self-certification on September 30, 2008, therefore, since this requirement has been fulfilled, it will not be included in the operating permit.

- An application for the modification of the Operating Permit is due within one year of commencing operation (condition 19).

  By submitting this modification application, this requirement has been fulfilled; therefore, it will not be included in the operating permit.

- APEN reporting requirements (condition 20).

The APEN reporting requirements will not be identified in the permit as a specific condition but are included in Section IV (General Conditions) of the permit, condition 22.e.

2. Emission Factors: Approval of emission factors is necessary to monitor compliance with the permit limitations. The following emission factors will be included in the operating permit.

Pollutant	Manufacturer's Emission Rates[1]	
	lb/hr	lb/10^3 gal[2]
PM	0.4	2.31
PM_{10}	0.4	2.31
NO_X	48.11	277.6
VOC	1.17	11.9
CO	5.86	33.8

[1]assumes all PM = PM_{10}
[2]converted to lb/gal based on the fuel usage rate at the highest projected manufacturer's lbs/hr emission rate (for PM, NO_X and CO, this is 100% load (173.3 gal/hr) and for VOC it is 50% load (98.4 gal/hr).

SO_2 emissions are based on a fuel sulfur content of 0.0045 % by weight. This results in an emission factor of 0.634 lb/10^3 gal, assuming a diesel density of 7.05 lb/gal.

Note that based on the preliminary analysis for the construction permit, PM, PM_{10}, SO_2 and VOC emissions were below the APEN de minimis levels at the requested throughput rate and therefore emission limits for those pollutants were not included in the construction permit and won't be included in the operating permit.

3. Monitoring Plan: The source shall be required to monitor fuel consumption and calculate emissions from each generator, monthly. Hours of operation and the maximum hourly fuel consumption rate shall be used to determine fuel consumption from individual generators. EPA Reference Method 9 observations shall be required to monitor compliance with the opacity requirements. Compliance with the sulfur dioxide requirements shall be presumed provided the diesel fuel meets the sulfur limitation.

<u>Replacement of Fire Pump Engine</u>

In an e-mail received on May 26, 2009, the source indicated that they would like to replace one of the fire pump engines (under Colorado Construction Permit 95BO557, Section II.1 of the permit). The engine was manufactured prior to July 1, 2006; therefore it is not subject to the requirements in 40 CFR Part 60 Subpart IIII.

The Division revised Section I, Condition 6.2 to revise the description of the G023 to reflect the new fire pump engine. In addition, the horsepower and fuel rate information in Section II, Condition 1.3 of the permit was revised to reflect the new engine.

Other Modifications

In addition to the requested modifications made by the source, the Division used this opportunity to include changes to make the permit more consistent with recently issued permits, include comments made by EPA on other Operating Permits, as well as correct errors or omissions identified during inspections and/or discrepancies identified during review of this modification.

The Division has made the following revisions, based on recent internal permit processing decisions and EPA comments on other permits, to the IBM Operating Permit with the source's requested modifications. These changes are as follows:

Section I – General Activities and Summary

- Changed the citation for the definition of 8-hour ozone control area in Condition 1.1.

- Corrected Condition 1.1 to indicate that there are three (3) cooling water towers included in Section II of the permit.

- Other minor language changes were made to the description of the equipment in Condition 1.1.

Section II.1 and 2 – Emergency Generators

- Corrected the citations for the RACT requirements for PM_{10}, CO and/or NO_X.

IBM Facility Wide HAP Emissions

	HAP Emissions (tons/yr)				
Pollutant	Boilers	Emergency Generators	Nine (9) new Emergency Generators	Cooling Water Towers[1]	Total
Acetaldehyde		6.57E-04	2.75E-04		9.32E-04
Acrolein		1.35E-04	8.60E-05		2.21E-04
Benzene	7.78E-04	9.32E-03	8.47E-03		1.86E-02
Chloroform				3.91E-01	3.91E-01
Dichlorobenzene	4.20E-04				4.20E-04
Formaldehyde	3.29E-02	1.47E-03	8.61E-04		3.52E-02
Hexane	6.30E-01				6.30E-01
Naphthalene	2.26E-04	1.53E-03	1.42E-03		3.18E-03
Nickel	1.76E-02				1.76E-02
Toluene	2.43E-03	3.41E-03	3.07E-03		8.91E-03
Trichloroethane (TCA)	4.72E-05				4.72E-05
Xylenes		2.34E-03	2.11E-03		4.45E-03
POH			2.31E-03		2.31E-03
Total	6.84E-01	1.89E-02	1.86E-02	3.91E-01	1.11E-00

[1]Includes all cooling water towers, some of which are APEN exempt.